What is claimed is:

1. A method of fabricating a cathode comprising the steps of:

providing a substrate;

providing a solvent, having a solute disposed therein, the solvent and solute forming a binder solution;

immersing the substrate into the binder solution;

applying a voltage to the substrate thereby providing for the adhesion of the binder solution to the substrate and forming a layer of binder material on the substrate;

removing the substrate having the layer of binder material formed thereon from the binder solution;

providing a suspension bath characterized as a colloidal solution of an emitting structure;

immersing the substrate having the layer of binder material formed thereon, into the suspension bath;

removing the substrate from the suspension bath; and

thermal processing of the substrate to form adhesion properties.

2. A method of fabricating a cathode as claimed in claim 1 wherein the step of providing a substrate, includes providing a substrate having a plurality of patterned metal electrodes formed thereon a surface of the substrate.

3. A method of fabricating a cathode as claimed in claim 4 wherein the providing a solvent, having a solute disposed therein, includes the step of providing at least one of an alcohol, a water, or a glycerin solvent, having a solute salt disposed therein.

4. A method of fabricating a cathode as claimed in claim 3 wherein the binder material is magnesium hydroxide ($Mg(OH)_2$.

5. A method of fabricating a cathode as claimed in claim 3 wherein the step of providing a suspension bath characterized as a colloidal solution of an emitting structure includes a colloidal solution of carbon nanotubes suspended in a solvent.

6. A method of fabricating a cathode as claimed in claim 5 wherein the step of providing a suspension bath characterized as a colloidal solution of an emitting structure further includes the step of adding to the colloidal solution, a dispersion agent, to improve suspension properties.

7. A method of fabricating a cathode as claimed in claim 5 wherein the step of immersing the substrate having the binder material formed thereon, into the colloidal solution of an emitting structure further includes the step of applying a bias to the suspension bath, thereby providing for the migration and binding of the emitting structures to the binder material.

8. A method of fabricating a cathode as claimed in claim 1 wherein the step of thermal processing the substrate to form adhesion properties, further includes the formation of a plurality of micro-islands in the binder layer defined by a plurality of edges, the plurality of micro-islands having a plurality of emitting structures embedded in the micro-islands and protruding from the edges.

9. A method of fabricating a cathode comprising the steps of:

providing a substrate having a plurality of metal electrodes formed thereon;

providing a binder solution including a solvent and a solute salt;

depositing the binder solution on a surface of the substrate, thereby forming a layer of binder material on the plurality of metal electrodes formed thereon the substrate;

providing a carbon nanotube suspension bath;

immersing the substrate having the binder solution thereon, into the carbon nanotube suspension bath;

removing the substrate from the carbon nanotube suspension bath; and

thermal processing of the substrate to form adhesion properties in the binder layer and form micro-islands defined by a plurality of edges, and having carbon nanotubes protruding from the edges of the micro-islands.

10. A method of fabricating a cathode as claimed in claim 9 wherein the step of providing a solvent, having a solute disposed therein, includes the step of providing at least one of an alcohol, a water, or a glycerin solvent, having a solute salt disposed therein.

11. A method of fabricating a cathode as claimed in claim 10 wherein the alcohol is one of methanol, ethanol, or isopropyl alcohol (IPA).

12. A method of fabricating a cathode as claimed in claim 11 wherein the step of depositing the binder solution on a surface of the substrate, thereby forming a layer of binder material includes the step of applying a voltage to the substrate thereby providing for the adhesion of the binder solution to the substrate and forming a layer of binder material on the substrate.

13. A method of fabricating a cathode as claimed in claim 12 wherein the binder material is magnesium hydroxide ($Mg(OH)_2$.

14. A method of fabricating a cathode as claimed in claim 12 wherein the step of providing a carbon nanotube suspension bath includes the step of providing a colloidal solution of carbon nanotubes suspended in an alcohol solvent.

15. A method of fabricating a cathode as claimed in claim 12 wherein the step of providing a carbon nanotube suspension bath characterized as a colloidal solution of an emitting structure further includes the step of adding to the colloidal solution, a dispersion agent, to improve suspension properties.

16. A method of fabricating a cathode as claimed in claim 12 wherein the step of immersing the substrate having the binder material formed thereon, into the colloidal solution of carbon nanotubes further includes the step of applying a bias to the suspension bath, thereby providing for the migration and binding of the carbon nanotubes to the binder material.

17. A field emission cathode comprising:

a substrate;

a plurality of micro-islands formed on the substrate and defined by a plurality of edges, the plurality of micro-islands formed of a binder material;

a plurality of nanotubes embedded into the edges of the plurality of micro-islands, the plurality of nanotubes protruding therefrom the edges of the plurality of micro-islands.

18. A field emission cathode as claimed in claim 17 wherein the substrate includes a plurality of patterned metal electrodes formed on a surface of the substrate.

19. A field emission cathode as claimed in claim 18 wherein the binder material is an oxide.

20. A field emission cathode as claimed in claim 19 wherein the plurality of nanotubes are formed of carbon.